

200312768-1

10/686,110

REMARKS

This is a full and timely response to the non-final Official Action mailed March 6, 2007. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

By the present amendment, various claims have been amended. Claims 37-39 and 62-67 were withdrawn from consideration under the imposition of an earlier Restriction Requirement and cancelled without prejudice or disclaimer. Thus, claims 1-36, 40-61 and 68-70 are currently pending for further action.

Prior Art:

Claims 1-36, 40-61 and 68-70 were rejected as unpatentable under 35 U.S.C. § 103(a) over the combined teachings of U.S. Patent No. 6,828,961 to Elliott et al. ("Elliott") and U.S. Patent Application Pub. No. 2003/0090597 to Katoh et al. ("Katoh"). For at least the following reasons, this rejection is respectfully traversed.

Claim 1 recites:

A display system for displaying an image, comprising:
an image processing unit configured to process image data and generate a number of image sub-frames corresponding to said image data;
a modulator configured to modulate a light beam according to said image sub-frames;
a scrolling color device configured to scroll a plurality of colors across a face of said modulator to produce a color light beam bearing said number of image sub-frames;
display optics configured to display said image from said color light beam; and
a wobbling device configured to displace said color light beam such that said image sub-frames are displayed with varying spatial offsets.
(Emphasis added).

200312768-1

10/686,110

As explained in Applicant's specification, a scrolling color device moves or scrolls bands of a plurality of different primary colors across the face of a light modulator, *with all the primary colors being present on the modulator at the same time*. Referring to Applicant's specification, "Fig. 2 shows the image of red (114), green (115), and blue (116) segments of light moving, or scrolling, across the face (113) of a modulator." (Applicant's specification, paragraph 0028).

The Office is required to use this definition from Applicant's specification in understanding what a scrolling color device is, as recited in Applicant's claims. *Markman v. Westview Instruments*, 116 S. Ct. 1384 (1996); *McGill, Inc. v. John Zink Co.*, 736 F.2d 666, 674 (Fed. Cir. 1984); *ZMI Corp. v. Cardiac Resuscitator Corp.* 884 F.2d 1576, 1580, 6 U.S.P.Q.2d 1557, 1560-61 (Fed. Cir. 1988) ("words must be used in the same way in both the claims and the specification.").

Applicant has also explained that the claimed scrolling color device provides a distinct advantage that was not available or appreciated in the prior art *sequential* color devices. "[S]crolling color increases the brightness of a displayed image by allowing all the primary colors to be present on the modulator at the same time." (*Id.*). "Thus, the waste of light caused by *sequential* color is avoided." (Applicant's specification, paragraph 0020). (Emphasis added).

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966), the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue.

Unlike Applicant's claim, the state of the prior art did not include a scrolling color device. Rather, the prior art of record teaches display devices and systems in which

200312768-1

10/686,110

sequential color devices were used to sequentially apply light of a single primary color, one at a time, to the light modulator.

For example, Elliott clearly teaches a traditional color wheel that sequentially applies each primary color to a modulator, one at a time.

FIG. 2 is a perspective view of a sequential color display system 200. In the display system 200 of FIG. 2, light from source 202 is focused onto a spinning color wheel 204. The spinning color wheel 204 creates of beam of light that changes from one primary color to the next in rapid sequence. The primary colored beam of light impinges a spatial light modulator 206, in this case a DMD. (Elliott, col. 4, lines 10-17) (emphasis added).

Katoh also fails to teach or suggest the claimed scrolling color device. Applicant has previously explained that Katoh does not teach the claimed scrolling color device, and the current Office Action appears to agree.

Rather, the current Office Action argues that Elliott's color wheel (204) is the claimed scrolling color device. (Action of 3/6/07, p. 6, § 6). This is clearly unreasonable.

Applicant's specification does explain that a color wheel and associated system can be modified to function as a scrolling color device. (Claim 25). However, this involves modifying the system such that a beam of light incident on the color wheel shines *simultaneously* through a filter of *each* primary color so that, as explained above, a band of each primary color is incident simultaneously on the light modulator. This is illustrated in Fig. 4 of Applicant's specification and explained, for example, in paragraph 0033.

However, in contrast, Elliott's color wheel clearly does not and cannot function in this way. Therefore, Elliott's color wheel is merely an example of the traditional *sequential* color wheel device and is a clearly not a scrolling color device as claimed. Elliott's color wheel does not have the same functionality or provide the advantages that Applicant has discovered and disclosed with respect to the claimed scrolling color device.

200312768-1

10/686,110

Consequently, the state of the prior art, as evidenced by the cited teachings of Elliott and Katoh, did not include a scrolling color device. Moreover, the differences between the state of the prior art and Applicant's claims are substantial. This is particularly true in that Applicant has discovered, and Applicant's claimed system provides, advantages, such as improved brightness, over the cited prior art. Therefore, Elliott and Katoh cannot support a rejection of claim 1 under *Graham*.

Stated another way, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). As demonstrated above, Elliott and Katoh clearly fail to teach or suggest at least the scrolling color device of claim 1.

For at least these reasons, the rejection of claim 1 and its dependent claims based on Elliott and Katoh should be reconsidered and withdrawn.

Independent claim 28 recites:

A display system for displaying an image based upon image data, comprising:
an image processing unit configured to define a plurality of sub-frame images including a first sub-frame image and at least a second sub-frame image based upon said image data;

a scrolling color device configured to generate a scrolling color light beam comprising a plurality of colors;

a spatial light modulator disposed to receive and modulate said scrolling color light beam based upon said plurality of sub-frame images; and

a wobbling device configured to cause said sub-frame images to be displayed in an alternating manner such that said first sub-frame image is spatially offset from said second sub-frame image.

(Emphasis added).

In contrast, as demonstrated above, Elliott and Katoh do not teach or suggest the claimed display system including a scrolling color device. Neither Elliott nor Katoh teach or

200312768-1

10/686,110

suggest any component that is "configured to generate a scrolling color light beam *comprising a plurality of colors*." (Emphasis added).

Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these reasons, the rejection of claim 28 and its dependent claims based on Elliott and Katoh should be reconsidered and withdrawn.

Independent claim 34 recites:

A display system for displaying an image during an image frame period based upon image frame data defining an image frame, comprising:

image processing electronics configured to generate a plurality of sub-frame data arrays based on said frame data, each of said sub-frame data arrays defining each of separate sub-frame images during said frame period;

a spatial light modulator configured to generate a light beam based on said sub-frame data arrays;

a scrolling color device configured to scroll a plurality of colors simultaneously across said spatial light modulator during said generation of said light beam; and

a wobbling device configured to provide a relative displacement of each of said sub-frame images during said frame period.

(Emphasis added).

Support for the amendments to claim 34 is found in Applicant's originally filed specification at, for example, paragraph 0028.

As demonstrated above with respect to claim 1, Elliott and Katoh do not teach or suggest the claimed display system that includes "a scrolling color device configured to scroll a plurality of colors *simultaneously* across a face of said spatial light modulator." (Emphasis added). Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least

200312768-1

10/686,110

these reasons, the rejection of claim 34 and its dependent claims based on Katoh should be reconsidered and withdrawn.

Independent claim 40 recites:

A method of displaying an image, said method comprising:
processing image data defining said image and generating a number of image sub-frames corresponding to said image data;
generating a light beam bearing said number of image sub-frames with a modulator;
scrolling a plurality of primary colors across a face of said modulator during said generation of said light beam such that said light beam comprises a color light beam bearing said number of image sub-frames, wherein a band of each of said primary colors is incident simultaneously on said face of said modulator during said scrolling;
displaying said color light beam to form said image; and
displacing said color light beam such that each of said number of image sub-frames is spatially displayed in an image sub-frame location offset from others of said image sub-frames.

(Emphasis added).

Support for the amendments to claim 40 is found in Applicant's originally filed specification at, for example, paragraph 0028.

As demonstrated above, Elliott and Katoh do not teach or suggest a method that includes "scrolling a plurality of primary colors across a face of said modulator during said generation of said light beam such that said light beam comprises a color light beam bearing said number of image sub-frames, wherein a band of each of said primary colors is incident simultaneously on said face of said modulator during said scrolling." The prior art provides no such subject matter.

Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least

200312768-1

10/686,110

these reasons, the rejection of claim 40 and its dependent claims based on Elliott and Katoh should be reconsidered and withdrawn.

Independent claim 68 now recites:

A system for displaying an image, said system comprising:
processing means for processing image data defining said image and
generating a number of image sub-frames corresponding to said image data;
modulation means for generating a light beam bearing said number of image
sub-frames;
scrolling means for scrolling a plurality of primary colors across a face of said
modulation means during said generation of said light beam such that said light beam
comprises a color light beam bearing said number of image sub-frames, *wherein a
band of each of said primary colors is incident simultaneously on said face of said
modulator during said scrolling*;
display means for displaying said color light beam to form said image; and
displacement means for displacing said color light beam such that each of said
number of image sub-frames is spatially displayed in an image sub-frame location
offset from others of said image sub-frames.

(Emphasis added).

Support for the amendments to claim 68 is found in Applicant's originally filed specification at, for example, paragraph 0028.

As demonstrated above, Elliott and Katoh do not teach or suggest a system for displaying an image that includes "*scrolling means for scrolling a plurality of colors across a face of [a] modulation means*" "*wherein a band of each of said primary colors is incident simultaneously on said face of said modulator during said scrolling.*" Again, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). For at least these reasons, the rejection of claim 68 and its dependent claims based on Elliott and Katoh should be reconsidered and withdrawn.

200312768-1

10/686,110

Additionally, the dependent claims of the application recite subject matter that is clearly further patentable over the teachings of Elliott and Katoh. Specific, non-exclusive examples follow.

Claim 2 recites "wherein said scrolling color device scrolls said plurality of colors across said face of said modulator an integer number of times during an image sub-frame time period corresponding to said each of said number of image sub-frames." As has been demonstrated above, Elliott and Katoh fail to teach or suggest the claimed scrolling color device. Consequently, it is unclear how the cited prior art can teach that a "scrolling color device scrolls said plurality of colors across said face of said modulator an integer number of times during an image sub-frame time period corresponding to said each of said number of image sub-frames" as recited in claim 2.

Claim 4 recites "a system timing unit configured to synchronize said scrolling color device and said wobbling device such that said scrolling color device scrolls said plurality of colors across said face of said modulator an integer number of times during an image sub-frame time period corresponding to said each of said number of image sub-frames." Again, Elliott and Katoh do not teach a scrolling color device. Consequently, it is unclear how the cited prior art can teach or suggest a timing unit for synchronizing the operation of a scrolling color device and a wobbling device as recited in claim 4.

Double Patenting:

The recent Office Action also rejected the pending claims under the judicially-created doctrine of obviousness type double patenting in view of either U.S. Patent No. 7,086,736 or 6,984,040. For at least the following reasons, these rejections are also respectfully traversed.

200312768-1

10/686,110

With regard to U.S. Patent No. 7,086,736, the Office Action argues that the scrolling color device of the present claims is equated with "a sequential color device configured to shine a color light beam on a face of said modulator, said color light beam having a color that sequentially rotates through said plurality of colors" as taught by U.S. Patent No. 7,086,736. (Action of 3/6/07, p. 3). This is clearly incorrect.

As noted above, and as clearly explained in Applicant's specification, a scrolling color device is different from a sequential color device. "In a scrolling color display system, all the primary colors are present on the modulator at the same time. Thus, the waste of light caused by sequential color is avoided. A display system configured to enhance an image's apparent resolution and hide pixel inaccuracies while using scrolling color is described herein." (Applicant's specification, paragraph 0020).

Therefore, the recent Office Action fails to demonstrate that the claims of U.S. Patent No. 7,086,736 teach, suggest or render obvious all the elements of the claims of the present application. For at least this reason, the double patenting rejection based on U.S. Patent No. 7,086,736 should be reconsidered and withdrawn.

Likewise, with regard to U.S. Patent No. 6,984,040, the Office Action equates claimed scrolling color device of the present claims with "a periodic light generator having a varying color light period and configured to generate a sequence of primary colors during each of at least two of the image sub-frame periods" as taught by U.S. Patent No. 6,984,040. (Action of 3/6/07, p. 5). Again, this is clearly incorrect for the same reasons given above.

Therefore, the recent Office Action fails to demonstrate that the claims of the present application are obvious in view of the claims of U.S. Patent No. 6,984,040. For at least this reason, the double patenting rejection based on U.S. Patent No. 6,984,040 should also be reconsidered and withdrawn.

200312768-1

10/686,110

Conclusion:

For the foregoing reasons, the present application is thought to be clearly in condition for allowance. Accordingly, favorable reconsideration of the application in light of these remarks is courteously solicited. If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

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